

CLAIMS

What is claimed is:

1. A resin composition which exhibits reversible crosslinking behavior prepared by copolymerizing an alpha, beta ethylenically unsaturated monomer with an oil soluble metal salt prepared by reacting (A) a metal compound with (B) an acid functional compound which is a reaction product of (1) an alpha-beta ethylenically unsaturated hydroxy compound and (2) a carboxylic polyacid, anhydride, sulfur oxide, or phosphorus oxide.
2. The resin composition of claim 1 prepared in the presence of a free radical initiator.
3. The resin composition of claim 1 in the form of a hot melt adhesive.
4. The resin composition of claim 1 in the form of a pressure sensitive adhesive or sealant.
5. The resin composition of claim 4 wherein the pressure sensitive adhesive is a solvent based adhesive.
6. The resin composition of claim 1 wherein the alpha, beta ethylenically unsaturated monomer is one or more (meth)acrylates.
7. The resin composition of claim 6 in the form of a pressure sensitive adhesive wherein the unsaturated monomer is a mixture of butyl acrylate and 2-ethyl hexyl acrylate.
8. The composition of claim 1 cured in the absence of radiation conditions.
9. The composition of claim 1 wherein the metal of the metal compound is selected from the group consisting of lithium, sodium, potassium, cesium, magnesium, calcium, strontium, barium, titanium, zirconium, vanadium, chromium, molybdenum, tungsten, manganese, iron, cobalt, nickel, palladium, copper, zinc, cadmium, mercury, boron, aluminum, gallium, indium, silicon, germanium, tin, lead, antimony, and bismuth.

10. The composition of claim 9 wherein the metal salt is zinc oxide.
11. The composition of claim 1 wherein the carboxylic polyacid, anhydride, sulfur oxide, or phosphorus oxide is selected from the group consisting of include phthalic acid, trimellitic anhydride, pyromellitic anhydride, 5-norbornene-endo-2,3-dicarboxylic anhydride, naphthyl anhydride, naphthalene tetracarboxylic acid dianhydride, maleic anhydride, succinic anhydride, chlorendic anhydride, maleic acid, succinic acid, fumaric acid, oxalic acid, malonic acid, glutaric acid, adipic acid, dimer fatty acids, styrene/maleic anhydride polymers, and methyl hexahydrophthalic anhydride.
12. The resin composition of claim 1 wherein the alpha-beta ethylenically unsaturated hydroxyl compound is an ethylenically unsaturated hydroxy derivative of a polyol.
13. The resin composition according to claim 12, wherein the said ethylenically unsaturated hydroxy derivative of polyol is selected from the group consisting of ethylene glycol, propylene glycol, 1,3-propanediol, 1,2, 1,3 or 1,4 butanediols, 2-methyl-1,3-propane diol (MPDiol), neopentyl glycol (NPG), alkoxylated derivatives of such diols, polyether diols, and polyester diols.
14. The resin composition according to claim 1 wherein the said oil soluble metal salt is a zinc salt prepared by reacting methyl hexahydrophthalic anhydride with a polyethylene glycol acrylate of the formula $\text{HO}(\text{C}_2\text{H}_5\text{O})_n\text{OCHC}=\text{CH}_2$ wherein n is 6 to form a half ester, and reacting the half ester with zinc oxide.
15. A process for recovering a crosslinked resin of claim 1 for recycling the said resin, comprising the steps of :
 - i) copolymerizing a composition as defined according to claim 1 to form an ionically crosslinked resin, and ii) recovering the said resin by heating the ionically crosslinked resin to a temperature wherein the resin flows.
16. The process of claim 15 wherein the temperature at step ii) is at least the temperature at which the resin is extrudable.

17. A process for recovering crosslinked resin for recycling comprising polymerizing a composition according to claim 1 to form an ionically crosslinked resin, and recovering resin by heating the ionically crosslinked resin to a temperature wherein the resin flows.
18. The process of claim 17 wherein the temperature is at least the temperature at which the resin is extrudable.
19. The process of claim 17 in the form of a pressure sensitive adhesive or sealant.
20. The process of claim 17 wherein the alpha, beta ethylenically unsaturated monomer is one or more (meth)acrylates.
21. The process of claim 17 in the form of a pressure sensitive adhesive wherein the unsaturated monomer is a mixture of butyl acrylate and 2-ethyl hexyl acrylate.
22. The process of claim 17 wherein the metal salt is zinc oxide.
23. The process of claim 17 The process of claim 17 wherein the metal salt is zinc oxide, the hydroxy functional compound is polyethylene glycol having 2 to 10 ethylene units, and the carboxylic polyacid, anhydride, sulfur oxide, or phosphorus oxide is methyl hexahydrophthalic anhydride.
24. The process of claim 23 wherein the comonomer is a mixture of butyl acrylate and 2-ethyl hexyl acrylate.
25. The process of claim 17 wherein the carboxylic polyacid, anhydride, sulfur oxide, or phosphorus oxide is selected from the group consisting of include phthalic acid, trimellitic anhydride, pyromellitic anhydride, 5-norbornene-endo-2,3-dicarboxylic anhydride, naphthyl anhydride, naphthalene tetracarboxylic acid dianhydride, maleic anhydride, succinic anhydride, chlorendic anhydride, maleic acid, succinic acid, fumaric acid, oxalic acid, malonic acid, glutaric acid, adipic acid, dimer fatty acids, and styrene/maleic anhydride polymers.